Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC

In the Matter of	)	
	)	
Reallocation and Services Rules	)	GN Docket No. 01-74
for the 698-746 MHz Spectrum Band	)	
(Television Channels 52-59)	)	

COMMENTS OF U. S. CELLULAR CORPORATION

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May 15, 2001

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Summary

U. S. Cellular Corporation ("U.S. Cellular") supports adoption of: the proposed co-primary allocation which includes fixed and mobile services in the 698-746 MHz band; Major Economic Areas ("MEAs") as the appropriate geographic service area size; channelization which creates two or three spectrum blocks in each MEA market; and open eligibility on all spectrum blocks.

U.S. Cellular has confined its comments to the geographic service area size issues in the Commission's Notice in consideration of the central role of service area size in promoting, through market-based approaches, the competitive development of advanced technologies in all areas of the country. The attached paper prepared by William P. Rogerson, Professor of Economics at Northwestern University, entitled "What Size of Geographic Service Areas Should The FCC Choose For the Auction of the 698-746 MHz Spectrum Band," describes his factual analysis and economic perspectives in the subject areas addressed by our recommendations.

The use of MEA service areas for the lower 700 MHz band is an appropriate and fair compromise of the needs of regional/rural and nationwide carriers for access to 700 MHz spectrum for advanced technologies. MEAs are small enough for regional and rural carriers to bid efficiently to meet their spectrum needs in the areas where they provide valuable, cost-effective and locally-oriented services. MEAs are also flexible enough, when coupled with the ability under normal auction procedures to aggregate licenses, to be useful for national and super-regional service area strategies.

Adoption of nationwide or Economic Area Grouping ("EAG") service areas would prevent regional and rural carriers from participating in the lower 700 MHz band auction. A choice by the Commission to take this approach would mean that the Commission will have essentially prejudged the issue of whether the participation of regional and rural carriers would have been efficient or in the public interest.

Nor should the Commission adopt nationwide or EAG service areas in reliance on partitioning, disaggregation, secondary markets or affiliation rules and policies to promote the transfer of spectrum rights from national carriers to regional and rural carriers. These national carriers likely will not dispose of their 700 MHz spectrum for an extended period after it is licensed and will not dispose of spectrum in any event to regional or rural carriers that are actual or potential competitors. Our proposals are intended to enable regional/rural carriers to bid directly on MEA service area licenses in the lower 700 MHz band auction so they can participate in the rapid and competitive deployment of advanced technologies.

U.S. Cellular concludes that adoption of MEA service areas is an appropriate and fair compromise. The needs of national carriers are already met under the service and auction rules for the upper 700 MHz band. Adoption of MEA service areas for the lower 700 MHz band will establish comparable opportunities for regional and rural carriers in fulfillment of the statutory and policy objectives outlined in the Commission's Notice without depriving national carriers of a fair

opportunity to aggregate spectrum rights to deploy systems over super-regional or even national areas.

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Comments of U. S. Cellular Corporation

U. S. Cellular Corporation on behalf of itself and its subsidiaries, (collectively "U.S. Cellular"), by its attorneys, submits its comments in response to the Commission's Notice of Proposed Rulemaking (FCC 01-91) released March 28, 2001 ("Notice").

Introduction

U.S. Cellular strongly supports adoption of the proposed co-primary allocation including fixed and mobile services for this 48 MHz of spectrum. We agree with the Commission that 698-746 MHz band ("Lower 700 MHz Band") was appropriately identified in the Commission's 3G Notice[1] as suitable spectrum for 3G deployment and for expansion of the capacities of cellular radio telephone and other land mobile radio services.[2]

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[1] *See* Amendment of Part 2 of the Commission's Rules to Allocate Spectrum below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Notice of Proposed Rulemaking*, FCC 00-455 (rel. Jan. 5, 2001) app. D (*3G Notice*).

[2] Companion spectrum in the 746-764 and 776-794 MHz bands which was similarly reallocated last year is referred to in these Comments as the "upper 700 MHz band."

We propose the adoption of Major Economic Areas ("MEAs") as the appropriate geographic service area size to meet the needs of regional and rural carriers in the lower 700 MHz band in fulfillment of the statutory and policy objectives outlined in the Commission's Notice. As described here, this can be done without depriving national carriers of a fair opportunity to aggregate spectrum rights to deploy systems over super-regional or even national areas in this band.

We also support the creation of two or three spectrum blocks in each MEA market to promote flexible licensing options to encourage a variety of technologies and entrants and to create economic opportunity for a variety of applicants. The Commission should also adopt open eligibility on all spectrum blocks to enhance the opportunities of licensees to provide service in any market or combination of markets of their own choosing.

Because of the central importance of the determination of service area size in the Commission's Notice, we confine our comments to this critical aspect of the Commission's proposals. We attach a paper of William P. Rogerson, Professor of Economics, Northwestern University, entitled "What Size of Geographic Service Areas Should the FCC Choose for the Auction of the 698-746 MHz Spectrum Band?" (Attachment A hereto). His Paper discusses the importance of selecting the MEA service area size for licensing the lower 700 MHz spectrum to provide realistic licensing opportunities for regional/rural carriers and the achievement of the Commission's objectives in this proceeding.

Discussion

1. Assessment of the Uses to Which the Lower 700 MHz Band Are to be Put by Regional/Rural Carriers Support Selection of MEA Service Area Size.

A key factor in the Commission's assessment should be the uses to which the lower 700 MHz spectrum band are likely to be put including 3G and other advanced services to be deployed by the incumbent cellular, PCS and other CMRS providers which are already providing essential wireless services in regional and rural market areas.

As explained in Professor Rogerson's Paper, regional/rural carriers are likely to use the lower 700 MHz band spectrum either to expand their footprints or to increase their capacity to provide traditional voice services and new advanced services. (Paper, pp. 12-14 and 16) In the case of U.S. Cellular which provides commercial mobile services to approximately 3.2 million subscribers through 148 majority-owned and managed cellular systems, this spectrum is a potentially valuable resource to expand coverage and capacity in its regional markets. Other regional/rural carriers such as ALLTEL, Western Wireless, Qwest, Century Tel, Centennial, Rural Cellular, Leap Wireless, NTELOS, and others are also potentially benefited if they have comparable access to enhance their established networks serving regional and rural cluster areas where they compete with national and other regional carriers.[3]

[3] Maps depicting the areas which U.S. Cellular and many of these regional and rural carriers currently are licensed are included in Attachment B hereto for the convenience of the Commission.

From a technical standpoint, the lower 700 MHz band comprising of 48 MHz of spectrum is well suited either to expand the footprints or to increase the capacity of established regional and rural carriers. It has propagation and other technical characteristics which enhance its value for this purpose. For example, there are significant cost efficiencies from using such spectrum at existing cellular base station sites to expand existing capacity to accommodate 3G and other advanced services. Propagation at 700 MHz also is superior to PCS spectrum at 2 GHz making possible cost efficient network architectures to expand coverages to serve rural and less densely populated areas. These are the areas which U.S. Cellular and other regional and rural carriers serve, so this characteristic is valuable to carriers whose predominant role is service to such areas.

There are additional significant cost efficiencies for carriers intending to deploy lower 700 MHz spectrum in rural and less densely populated areas because this spectrum tends to be largely unencumbered in large areas comprising all or significant portions of a number of the MEAs outside the largest and most densely populated major metropolitan markets. As shown on the maps of the Channel 52-59 television broadcast allocations attached to the Commission's Notice, these large areas can be served without requiring the relocation of incumbent broadcast operations thereby saving the time and expense for carriers to work out costly relocations and making possible the rapid deployment of technologies in rural and less densely populated areas.

Incumbent providers like U.S. Cellular and others need realistic opportunities to bid for lower 700 MHz licenses so that they can expand the technologies and services available to consumers in the regions they serve. Adoption of MEA service areas for the lower 700 band will help promote, through market-based approaches, competitive deployment of advanced technologies in all areas of the U.S. by giving these important incumbent wireless providers a fair opportunity to compete for necessary spectrum resources.

2. Selection of MEA Service Area Size is an Appropriate Compromise of the Interests of National and Regional/Rural Carriers and Fairly balances the Interests of Both.

The Commission's selection of MEAs as the geographic service area size for the lower 700 MHz band meets the needs of regional/rural carriers while preserving realistic opportunities for national carriers to bid for this spectrum. In this case, MEAs serve the needs of both because the size is small enough for regional/rural carriers to bid efficiently and flexible enough, if coupled with the ability in the auction to aggregate licenses, to create national or super-regional service areas. We believe that the MEA service area size represents an appropriate compromise of the interests of all carriers and fairly balances their interests by offering realistic opportunities to pursue a range of coverage strategies.

As described in Professor Rogerson's Paper, there are two broad classes of wireless providers, national and regional/rural. (Paper, pp. 8-10). According to the data provided in his paper, the major regional/rural carriers collectively provide service to approximately 14 percent of the nation's wireless users. (Paper, Table 1)

As described in his paper, this 14 percent figure actually understates the importance of these regional/rural carriers in terms of their service to low density and rural areas.

The MEA building block approach which we propose will permit regional/rural carriers like U.S. Cellular and many others to provide an important source of competition, variety and diversity in rural areas and less densely populated areas. As stated in Professor Rogerson's Paper, "...While national carriers hold licenses that would enable them to provide service to most of the country, they have generally limited the buildout of their facilities to more dense and urban areas." (Paper, p. 10) Based on industry data presented in Professor Rogerson's Paper national carriers have generally built out their facilities to cover only approximately 3/4ths of the population in their licensed service areas. (Paper, Table 3) This means regional/rural carriers account disproportionately for services in areas where national carriers have limited or no interest. For example, based on market share data for 90 selected MSA/RSA markets, regional and rural carriers serve approximately 70 percent of the subscribers in these markets. (Paper, p. 11 and Table 4).

Another reason for the continuing important role of regional and rural carriers as competitors to national carriers is that within any regional market there are numerous consumers who make almost all of their wireless calls within "super cluster" areas which generally correspond to MEAs. Regional/rural carriers remain effective competitors with national carriers because of the diversity of these

consumer needs and interests and because they have continued to expand coverages in regional areas to match the natural footprint of the areas where their subscribers want to make wireless calls. (Paper, pp. 12-14)

While MEAs generally coincide with the regional economic footprints of regional/rural carriers, the selection of this service area size does not deprive national carriers of a fair opportunity to aggregate spectrum rights to deploy systems over super-regional or even national areas. As described by Professor Rogerson, firms with business plans to deploy nationwide networks will still have the opportunity to win licenses covering super-regional or national areas through aggregation under the normal operation of non-package simultaneous multiple round bidding procedures. (Paper, pp. 19-20) For the reasons described in Professor Rogerson's Paper and as discussed separately in these comments, we oppose (1) the adoption of national and super-regional or EAG service areas. and (2) the use of package bidding procedures which will bias auction outcomes for lower 700 MHz spectrum towards nationwide and/or super-regional aggregation.

Firms intending to serve national or super-regional/Economic Area Grouping ("EAG") footprints are already able to bid for 36 MHz of spectrum under the EAG service area and related national/EAG package bidding procedures approved for the upper 700 MHz band. National carriers bidding for upper 700 MHz band spectrum will have a two year head start and will be deploying on upper 700 MHz band spectrum which has fewer incumbents to be relocated than on the lower 700 MHz band spectrum. They will also have normal (non-package bidding) opportunities to

aggregate spectrum in the auction for the lower 700 MHz band. Regional/rural carriers proposing to deploy on lower 700 MHz spectrum will have a two-year wait but, at least with MEA service area sizes, they will have a fair chance to bid for the spectrum they need.[4]

3. Adoption of Nationwide or EAG Service Areas for the Lower 700 MHz Would Effectively Exclude Regional/Rural Carriers From Being Successful Bidders for such Spectrum.

As discussed in Professor Rogerson's Paper, the successful strategies of regional/rural carriers like U.S. Cellular have been based on building networks that cover the natural regional economic footprints predominantly outside large urban areas. (Paper, pp. 12-14, and 16) Nationwide and EAG service area sizes on the other hand are useful to national carriers with a different strategic view and the financial resources to deploy networks on such a scale. It is this mismatch which makes national and EAG service area sizes unfair and unworkable for regional/rural carriers.

The problems for regional/rural carriers in this regard are threefold. These regional/rural firms are either effectively precluded from bidding altogether or face severe financial challenges to bid for an EAG service area which far exceeds the size of the area it would like to serve. (Paper, p. 17) For example, U.S. Cellular which

[4] In the event the Commission might be prepared to modify its service and licensing rules for the upper 700 MHz band, we propose that the Commission consider adopting MEA service areas for that band as well. As explained by Professor Rogerson, "...it is possible to run relatively simple and tractable auctions even with as many as 52 service areas by restricting firms to bidding on only a limited number of packages." (Paper, pp. 18-19 and 20-21). This would give nationally oriented firms the opportunity to bid for nationwide footprints and smaller regional/rural firms the opportunity to bid on individual MEAs. It also eliminates the headstart advantage mentioned above and gives regional/rural carriers a chance to bid for upper 700 MHz spectrum which is less encumbered with television broadcast assignments and operations than the lower 700 MHz spectrum.

has widely dispersed clusters in all six EAGs would have the formidable burden of bidding for licenses in all six EAGs to win the spectrum needed to overlay its existing clusters. Second, even if regional/rural carriers could obtain access to financing to be able to bid, they would be disadvantaged by the disproportionate financial risk (and the associated transactional costs) of disaggregating spectrum in EAG areas which are not essential to their regional/rural service area plans. (Paper, p. 17, Fn. 16) Third, the "threshold problem" described in Professor Rogerson's Paper creates an decisionally significant bias in the selection of winning bidders in favor of national license aggregation even when this is inefficient. (Paper, p. 20) In this case this bias unfairly favors nationwide bidders at the expense of regional/rural bidders, a result which is clearly contrary to the Commission's statutory mandate in Section 309(j) and its objectives in this proceeding.

4. If Regional/Rural Carriers are Unable to Bid Directly on Lower 700 MHz Spectrum, It is Unlikely They will Obtain Timely and Adequate Access to Spectrum via Partitioning, Disaggregation, Other Secondary Market Transaction or Affiliate Relationships.

The foregoing problems of regional/rural carriers to obtain the spectrum rights they need to deploy 700 MHz technologies are not avoided by the operation of the Commission's partitioning, disaggregation, secondary markets and wireless affiliation rules and policies.

As explained in Professor Rogerson's Paper, "...there is a reasonable likelihood that national carriers will simply choose to warehouse spectrum that they have no near-term plans to use instead of selling it." (Paper, pp. 14-15) They will probably conclude that it is less costly to retain underused spectrum rights than to

risk that a sale of spectrum rights will deprive a national carrier of spectrum which might be needed at some future date. In addition, it is likely that national carriers will be focused on deploying technologies and capturing market share in their main markets for at least a two to three year period after 700 MHz licenses are awarded so that disaggregation and partitioning are simply not options during this period, if ever. See, for example, the data in Table 3 to Professor Rogerson's Paper with respect to the continuing retention of unbuilt pops by the national carriers in this regard. The third problem which Professor Rogerson describes is that national carriers are highly unlikely to disaggregate and partition spectrum to regional/rural carriers that are actual or potential competitors. (Paper, p. 15-16) In the event there is any disposition at all to dispose of spectrum, national carriers are likely only to do so pursuant to affiliate relationships which limit or prohibit competition between the affiliate and that national carrier. (Paper, p. 15)

In sum, regional/rural carriers are likely to be precluded, or at a minimum will encounter substantial (and perhaps insurmountable) delays and costs in their attempts to obtain 700 MHz spectrum rights from national carriers. Our proposed solution, which will enhance competition and promote the early deployment of advanced 700 MHz technologies, is to enable regional/rural carriers to bid directly on MEA service area licenses in the lower 700 MHz band auction.

5. Exclusive Use of Nationwide or Super-Regional Service Areas for the Lower 700 MHz Band Will Not Maximize the Opportunity to provide the Widest Array of Services and Business Plans.

The Commission requests comment regarding the "...extent to which nationwide licenses maximize the opportunity to provide the widest array of services and business plans."[5] As discussed in Professor Rogerson's Paper, (Paper, pp. 21-22), the existing encumbrances in terms of UHF broadcast allocations in this band will delay a winning bidder of a nationwide or super-regional license from using 700 MHz technologies to launch new services on a nationwide or super-regional basis. He concludes that "...even large national firms will use the spectrum to increase their capacity to offer voice services in certain regions or to offer localized services..." (Paper, p. 22). On this basis, the Commission could reasonably conclude that nationwide licensing is not inherently more valuable than MEA licensing. Nor is there any reasonable basis to conclude that new technologies or services will be deployed more rapidly or widely under nationwide licensing than under MEA licensing. If the Commission chooses service areas significantly larger than MEAs, rural/regional carriers will be unable to participate and the Commission will have essentially prejudged the issue of whether or not their participation would have been efficient and in the public interest.

Conclusion

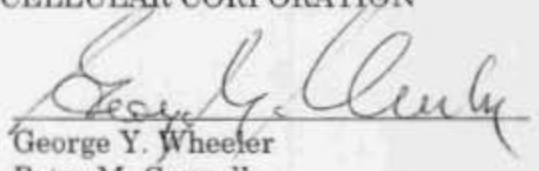
Among the most important issues before the Commission in this proceeding is how to create licensing opportunities in the lower 700 MHz band which promote,

[5] Lower 700 MHz Notice, ¶ 55.

through market-based approaches, the competitive development of advanced technologies in all areas of the country. We propose the adoption of MEA service areas for this band as an appropriate and fair compromise of the needs of nationwide and regional/rural carriers alike for access to spectrum for these advanced technologies. The needs of national carriers to acquire spectrum are already met under the service and auction rules adopted for the upper 700 MHz band. Adoption of MEA service areas for the lower 700 MHz band will establish comparable opportunities to acquire spectrum at auction for regional/rural carriers without depriving national carriers of a fair opportunity to aggregate spectrum rights to deploy systems over super-regional or even national areas in the lower 700 MHz band.

Respectfully submitted,

U. S. CELLULAR CORPORATION

By: 

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May 15, 2001

ATTACHMENT A

What Size of Geographic Service Areas Should The FCC Choose For the Auction of the 698-746 MHz Spectrum Band?

William P. Rogerson
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May 15, 2001

What Size of Geographic Service Areas Should The FCC Choose For the Auction of the 698-746 MHz Spectrum Band?

William P. Rogerson
Professor of Economics, Northwestern University

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1. Introduction and Executive Summary

I am a professor of economics at Northwestern University. In 1998-99, I was Chief Economist at the Federal Communications Commission. In addition, I have written academic articles regarding economic perspectives on telecommunications regulation and served as an economic expert for the Federal Trade Commission in connection with its AOL/Time Warner proceeding. A copy of my curriculum vitae is attached.

The Federal Communications Commission has determined to auction spectrum in the 698-746 MHz, 746-764 MHz and 776-794 MHz bands to private parties for flexible commercial use. In a previous order[1] the Commission determined the procedures and rules it will use to auction spectrum in the 746-764 MHz and 776-794 MHz bands. The Commission has recently released an NPRM[2] as a first step in determining the rules and procedures it will use to auction spectrum in the 698-746 MHz band.

The FCC typically does not auction the right to use a band of spectrum over the entire country as a single item. Rather, to allow for the possibility that it may be efficient for firms to use the spectrum in smaller geographic areas, it divides the country into regions or service areas and auctions the rights to use spectrum over particular service areas as separate items. One of the issues the Commission has raised in its recent NPRM concerns the size of service areas it should use for the auction of spectrum in the 698-746 MHz band. In this paper I analyze how

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[1] *In the Matter of Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, First Report and Order (First Report and Order on the 746-764 MHz and 776-794 MHz Bands)*, FCC 00-5, January 6, 2000.

[2] *In the Matter of Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59) Notice of Proposed Rule Making (NPRM on the 698-746 MHz Band)*, FCC 01-91, March 16, 2001.

varying the size of service areas would affect the results of the auction and therefore affect the public interest.

I draw five main conclusions: (1) Regional/rural carriers serving small geographic areas provide an important source of competition, variety, and diversity in rural and less dense areas. Auctioning spectrum in geographic blocks too large for these carriers to use would disadvantage these carriers and thereby harm consumers in less dense and rural areas that depend upon them; (2) If regional/rural carriers are unable to directly bid on licenses, it is unlikely that they will be given timely or adequate access to this spectrum via partitioning, disaggregation, sales on secondary markets or affiliation arrangements; (3) Defining service areas to be the approximate size of Major Economic Areas (MEAs) would provide regional/rural carriers with a reasonable opportunity to compete for licenses, but defining service areas to be the approximate size of Economic Area Groups (EAGs) would not; (4) Defining service areas to be the approximate size of MEAs will not prevent national firms from obtaining super-regional or even national footprints through aggregating licenses. The standard simultaneous multiple round auction format used by the Commission is designed to help facilitate firms' efforts to aggregate licenses. Furthermore, the Commission could further facilitate such efforts by using simple and tractable forms of package bidding[3]; and (5) The synergies that nationally oriented firms may experience from winning national or super-regional footprints for spectrum in the 698-746 MHz range may not be particularly significant in any event. This is because the spectrum in question is encumbered with

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[3]As will be explained below, package bidding creates both benefits and harms relative to the normal simultaneous multiple round auction format used by the Commission. Therefore, it is possible that the normal (non-package) auction format would be superior to the package auction format, depending on the relative size of these benefits and harms.

existing UHF channels that will have the right to continue to use parts of the spectrum in certain geographic areas through at least 2006, and perhaps much longer.

In the remainder of this executive summary, I will briefly expand upon these five conclusions. My first conclusion is that regional and rural wireless carriers supply an important source of competition, variety, and diversity in less dense wireless markets and, that furthermore, in many rural and less dense areas they are the only carriers that have demonstrated any interest or inclination to provide wireless service. These carriers need additional spectrum to expand their existing coverage to adequately serve natural regional economic areas that their customers desire service over and to offer advanced services in and around their service areas. Therefore, it is important that service areas for the 698-746 MHz band be defined small enough so that these carriers are able to bid on and purchase licenses and thereby gain access to this new spectrum. If service areas are defined to be so large that only national carriers are able to bid on them, this will place regional and rural carriers at a competitive disadvantage and thereby reduce the benefits of competition, variety, and diversity that regional and rural carriers provide. Furthermore, to the extent that this new spectrum will be used to provide advanced services, denial of this spectrum to regional and rural carriers will slow the roll-out of advanced services to rural and less dense regions of the country.

My second conclusion is that if regional/rural carriers are unable to directly bid on licenses because of the large geographic areas and therefore high cost, it is unlikely that they will be given timely or adequate access to portions of this spectrum via partitioning, disaggregation, sales on secondary markets or affiliation arrangements. Based on historical patterns, it seems likely that national carriers would choose to warehouse spectrum in low density areas even if they did not

have near-term plans to use it. At a minimum, dividing spectrum licenses in rural areas and selling divided licenses to smaller firms is highly unlikely to be a top priority of national firms focused on capturing market share and rolling out new services in urban areas. Therefore there would be long delays before this spectrum was placed in the hands of firms interested in using it. Furthermore, even if national firms do eventually sell some of this spectrum, they are unlikely to sell it to regional firms that compete or threaten to compete with them.

My third conclusion is that defining service areas of the approximate size of MEAs (the United States is divided into 52 MEAs) would allow regional/rural carriers a reasonable opportunity to compete, but defining service areas of the approximate size of EAGs (the United States is divided into 6 EAGs) would not. While some consumers travel extensively over the entire country and desire a wireless plan that offers low nation-wide prices, other consumers confine the bulk of their travel to smaller regional areas and are more interested in wireless plans that offer good regional coverage and low regional prices. Regional/rural carriers are oriented towards serving consumers in this latter group who live outside the major metropolitan areas. In order to serve this group of customers, regional/rural carriers need to build networks over the natural regional footprints that such consumers desire service over. There do not appear to be significant economies of scale in serving such consumers through much larger licensed service areas. Regions the size of the 52 MEAs approximate such natural economic footprints much better than do regions the size of the 6 EAGs. The EAGs are simply too large; a single EAG typically contains multiple natural footprints for providing regional service. Furthermore, defining service areas to be the size of EAGs makes it impossible for regional/rural carriers to bid on rural and less dense areas without simultaneously bidding on major metropolitan areas.

My fourth conclusion is that defining service areas to be the approximate size of MEAs will not prevent national firms from obtaining super-regional or even national footprints through aggregating licenses. The standard simultaneous multiple round auction format used by the Commission is designed to help facilitate firms' efforts to aggregate licenses. Furthermore, the Commission could further facilitate such efforts by using simple and tractable forms of package bidding. In package bidding, firms are allowed to place bids on entire packages of service areas as well as individual service areas. It is possible to run simple and tractable package auctions even with as many as 52 service areas by restricting firms to bidding on only a limited number of packages. For example, firms could be allowed to bid on packages of licenses that formed EAGs and also to bid on an entire national package of licenses. Allowing firms to bid on these seven possible packages in addition to bidding on individual MEAs would still allow for a simple and tractable auction. However, as will be explained below, package bidding creates both benefits and harms relative to the normal simultaneous multiple round auction format used by the Commission. Therefore, it is possible that the normal (non-package) auction format would be superior to the package auction format, depending on the relative size of these benefits and harms.

My fifth conclusion is that the synergies that nationally oriented firms may experience from winning national or super-regional footprints for spectrum in the 698-746 MHz range may not be particularly significant in any event. This is because the spectrum in question is encumbered with existing UHF channels that will have the right to continue to use parts of the spectrum in certain geographic areas through at least 2006, and perhaps much longer. These UHF stations tend to be located in more dense areas which are precisely the areas that would be most valuable to a national provider of some new sort of advanced service. Therefore, winning a nationwide or

super-regional license to use a particular band of this spectrum does not actually confer the ability to offer a new service nationwide or super-regionally. Instead it is only the first step in a longer process that would involve cobbling together other bands of spectrum to use in areas that are being used by existing UHF channels. This reduces the value of winning a nationwide or super-regional license and also makes it more likely that even large national firms will use the spectrum to increase their capacity to provide voice services in certain regions or to offer more localized advanced services.

In summary, if the Commission chooses service areas to be significantly larger than MEAs, rural/ regional carriers will be unable to participate and the Commission will have essentially prejudged the issue of whether or not their participation would have been efficient and in the public interest. By defining service areas at the MEA level, and by possibly allowing some simple types of package bidding, the Commission can provide a fair opportunity for both regional/rural and national firms to participate in the auction. This will allow competitive bidding to determine the most efficient use of the spectrum.

The remainder of the paper proceeds as follows. Section 2 provides some background information. Section 3 documents that regional and rural firms supply an important source of competition, diversity, and variety in less dense markets. Section 4 explains why regional/rural firms are unlikely to be provided with timely or adequate access to this spectrum on secondary markets if they are unable to bid directly for it. Section 5 explains why service areas the size of MEAs will provide regional/rural firms with a reasonable opportunity to bid on licenses while service areas the size of EAGs will not. Section 6 describes why the simultaneous multiple round auction format facilitates license aggregation and how simple and tractable package auctions

could be used to further facilitate nationally oriented firms' efforts to aggregate licenses. Section 7 describes the nature of the encumbrances on the spectrum to be auctioned in more detail and explains why this makes the spectrum less suitable for offering some new sort of service on a national or super-regional basis. Finally, Section 8 draws brief conclusions.

2. Background Information

In the past, the Commission has used service areas of widely varying sizes for different bands of spectrum. The country is divided into 734 service areas for purposes of defining cellular licenses - 306 Metropolitan Statistical Areas (MSAs) and 428 Rural Statistical Areas (RSAs). PCS licenses in the C,D, E, and F bands are defined over 493 regions called Basic Trading Areas (BTAs) and PCS licenses in the A and B band are defined over 51 larger areas (consisting of groups of BTAs) called Major Trading Areas (MTAs). The Commerce department has divided the country into 175 regions called Economic Areas (EAs). The EAs are grouped together to create 52 Major Economic Areas (MEAs) and these in turn are grouped together to create 6 Economic Area Groups (EAGs).[4] In its recent order,[5] the FCC has decided to define licenses over EAGs for purposes of auctioning off spectrum in the 746-764 MHz and 776-794 MHz bands.

There are six mobile telephony providers that are generally viewed as being national carriers in the sense that they own licenses and cover the vast bulk of the more dense areas of the country using their own facilities. The remaining carriers are usually referred to as regional or

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[4]See www.fcc.gov/wtb/auctions for maps of the various regions. (Site visited 5-7-01).
[5]*First Report and Order on the 746-764 and 776-794 MHzBands, supra* note 1.

rural carriers. They tend to be much smaller, to focus only on some regions of the country, and to focus on less dense rural areas. While much attention has been given recently to the formation and growth of the national carriers, regional carriers remain an important part of the provision of wireless services in the U.S.

Tables 1 and 2 provide some basic data on the size and coverage of the major regional/rural and national carriers. Table 1 presents data on the number of subscribers. There were ten independent (not affiliated with a national carrier) regional/rural carriers that each had over 100,000 subscribers each at the end of 2000. These carriers served a total of 13.9 million subscribers. This constitutes about 14 percent of total wireless telephony subscribers nationwide and is greater than the number of subscribers served by three of the six national carriers.

Table 2 presents data on the population that lives in the area each carrier is licensed to serve (licensed POPS). The ten independent regional/rural carriers having over 100,000 subscribers each at the end of 2000 (shown in Table 1) held cellular and PCS licenses covering from 3.4 million to 72.5 million POPs. Only three of these regional/rural carriers own licenses that enable them to serve more than 10 percent of the U.S. population and most have much smaller coverage areas than this. In contrast, the national carriers all hold licenses to serve nearly all of the nation's population.

Some or perhaps all of the major regional/ rural carriers (as well as other smaller regional/rural carriers) are actively seeking additional spectrum licenses for regional geographic areas in or around their service areas. Many regional/rural carriers were qualified bidders for BTA PCS licenses in the recent Auction 35 or have recently purchased MSA/RSA cellular or

BTA PCS licenses.[6] Many regional/rural carriers have invested heavily in licenses, networks and operations, and are likely to be interested in bidding on MEAs in the 700 MHz band.

3. Regional/Rural Carriers Provide an Important Source of Competition, Variety, and Diversity in Rural and Less Dense Markets

The regional/rural carriers shown in Table 1 collectively provide service to about 14 percent of the nation's wireless users. While this is a significant share of wireless subscribers in and of itself, it vastly understates the importance of regional/rural carriers in rural and less dense areas. While the national carriers hold licenses that would enable them to provide service to most of the country, they have generally limited the build-out of their facilities to more dense and urban areas. Table 3 shows the size of the population that each of the national carriers is able to provide service for over its own facilities (covered POPS) versus the population within its licensed area (licensed POPS). National carriers have generally built-out their facilities to cover only about 3/4 of the population they are licensed to serve. Regional/rural carriers have been left to serve the areas that the national carriers have no interest in.

The result of this, as the Commission has noted in its own assessments of the competitive landscape in wireless markets,[7] is that markets in dense urban areas are quite different than

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[6] See *Auction of Licenses for the C and F Block Broadband PCs Spectrum: 87 Qualified Bidders*, Public Notice DA 00-2725, Attachment A (Dec. 1, 2000); *Wireless Telecom Investor*, Paul Kagan Associates (reporting over the past year proposed wireless deals including purchases by ALLTEL, U.S. Cellular, Western Wireless, Centennial, Rural Cellular, PR Tel Cell, Leap Wireless, and many other regional carriers).

[7] See, for example, *Fifth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services (Fifth Annual Report on Wireless Markets)*, FCC-00-289, August 18, 2000. This analysis overstates the number of carriers offering services in rural and less dense areas because it treats service to any part of a county as coverage of all the population in that county.

markets in less dense rural areas. Dense urban markets tend to have 5 or more major competitors and most of them are national firms. On the other hand, rural and less dense areas often are served by at most two carriers and are primarily or totally served by smaller regional/rural carriers. According to the FCC's analysis in the *Fifth Annual Report on Wireless Markets*,[8] about 12% of the U.S. population is served by two or fewer wireless carriers. Of course, there are also intermediate density markets such as those in smaller cities where there is generally an intermediate level of competition; it is not unusual for both some national and some regional/rural firms to provide service in such areas.

U.S. Cellular has provided me with recent market share data by RSA/MSA for 90 of the RSA/MSAs that it serves.[9] Table 4 presents the total market share of all regional carriers in each of these 90 RSA/MSA regions, ordered from RSA/MSAs where regional carriers have the highest market share to RSA/MSAs where regional carriers have the lowest market share. In 19 of the 90 RSA/MSAs, national carriers have no presence at all and regional carriers serve 100 percent of the subscribers in the market. In 47 of the 90 RSA/MSAs, regional carriers serve at least 70 percent of the subscribers in the market. On average over all 90 RSA/MSAs, regional carriers serve 70 percent of the subscribers in the market.[10]

These various sources of data show that regional and rural carriers play an important role

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[8]See note 7.

[9] These 90 RSA/MSAs constitute well over half of the 142 RSA/MSAs that US Cellular provides service in. Recent data was not available for the other RSA/MSAs served by US Cellular. Studies to determine these market shares were conducted between February 2000 and April 2000.

[10]That is, the simple average value of the 90 market shares is equal to 70 percent. The weighted average (using weights determined by 1990 census population figures for each RSA/MSA) is equal to 64 percent.

in providing wireless service in rural and less dense areas. In many rural low-density areas, no national carriers have any presence at all. In somewhat more dense urban areas such as areas containing small cities, regional/rural carriers often serve a significant share of the subscribers.

In light of this, what consequences would follow if spectrum in the 698-746 MHz range was sold in large service areas that regional/rural firms were unable to afford to bid on? Firms are likely to use this spectrum to either expand their footprint and increase their capacity to provide traditional voice service or to provide new advanced services. In rural low-density areas that are not served by any national carrier, the consequence for consumers of denying use of this spectrum to regional/rural firms will be that improved voice services and advanced services will not be provided or at least that their rollout will be delayed until national firms get around to deciding to provide service in these areas. In intermediate density areas, such as small cities, where regional/ rural carriers play an important competitive role but where one or more national carriers are also present, the consequences may be even more serious. To the extent that regional/rural carriers are denied new spectrum, it will still be the case to some extent that the rollout of improved voice service and new advanced services will be delayed. However, an even more serious consequence of denying this spectrum to regional/rural firms will be that rural/regional firms will be put at a competitive disadvantage relative to national firms that do have access to this spectrum. In many of these markets, regional/rural firms play an important competitive role and competition would be severely harmed if regional/rural firms were disadvantaged.

In areas such as small cities where regional/rural firms compete with national firms for customers, there is every reason to believe that regional/rural firms will continue to be able to provide an important source of competition, diversity and variety in these markets over the long

run so long as the Commission does not take actions which impede these regional/rural firms' ability to compete. Regional/rural firms can have a number of advantages over national firms which can appeal to certain segments of consumers. Perhaps most importantly, regional/rural carriers often provide better coverage over regional/rural areas than do national carriers that operate there.[11] Therefore consumers that choose the regional/rural carrier often experience higher call quality and fewer dropped calls than do consumers that choose the national carrier. Regional/rural carriers also often offer more retail locations in their areas than do national firms. Finally, the independent regional/rural carriers can be a source of innovative and different pricing plans and services that might appeal to local needs and interests.[12]

Perhaps the main advantage that national firms have over their regional/rural competitors is that national firms are able to offer national one-rate plans at a lower cost than can regional/rural firms. This is because the national firms can supply service over much of the nation on their own network, while regional firms must purchase roaming services from other firms. However, within any regional market, there are broad segments of consumers that make almost all of their wireless calls within the local region. For these consumers, the fact that a regional/rural carrier can provide better local coverage can be vastly more important than the fact that the national carrier can provide a lower price on a national one-rate plan. Regional/rural carriers can compete very effectively for this segment of consumers.

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[11]For example, U.S. Cellular states in its *1999 Annual Report* at 10 that "one of our competitive advantages is our excellent local network coverage."

[12]For example, this past year U.S. Cellular introduced FarmFlex, a price plan which enables farmers and agribusiness users to adjust their rate plans to accommodate calling volume variations between peak season and off-season months without having to change their contracts. See *U.S. Cellular 1999 Annual Report* at 10.

For example, in a strategic planning document prepared by Bain & Company for U.S. Cellular given to me by U.S. Cellular, Bain & Company estimate that 87 percent of the wireless users within U.S. Cellular's Pacific Northwest and Mid-Atlantic Markets are so called "local users" that make the bulk of their wireless calls within the local region that they live. Bain & Co., quite correctly in my opinion, suggest that this segment of customers is the natural segment for U.S. Cellular to concentrate on, and suggests that U.S. Cellular and other regional/rural carriers can compete effectively for such consumers with national carriers.[13]

4. If Regional/Rural Carriers Are Unable to Directly Bid on This Spectrum, It is Unlikely That They Will Receive Timely or Adequate Access to it Via Partitioning, Disaggregation, Sales on Secondary Markets or Affiliate Relationships

The Commission allows the owner of a spectrum license over a service area to divide the service area into sub-areas and then sell the rights to use this spectrum on secondary markets to other firms. Therefore, it is theoretically possible that, even if regional/rural carriers were excluded from the original spectrum auction because service areas were too large for them to bid on, national firms might choose to divide off less dense areas that they did not have an near-term interest in serving, and sell the rights to use the spectrum to regional/rural firms that would make near-term use of it. In my opinion, such division (by disaggregation or partitioning) and sales on secondary markets is unlikely to provide regional/rural carriers with timely or adequate access to spectrum for three reasons.

First, there is a reasonable likelihood that national carriers will simply choose to

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[13] *U.S. Cellular Super-cluster Strategy Deliverables*, Bain & Co., December 5, 2000. Also see *U.S. Cellular 1999 Annual Report* at 11 where U.S. Cellular indicates that it is has a competitive advantage in serving this segment of consumers.

warehouse spectrum that they have no near-term plans to use instead of selling it. The Table 3 data appear to indicate this conduct with regard to prior wireless licenses. From the perspective of large national carriers, the prospective income they could earn on sales of spectrum in rural areas is quite small compared to the profits they seek from utilizing the large licenses in major urban markets. Therefore they might quite rationally decide to focus their efforts on capturing market share and rolling out new services in their main markets rather than diverting themselves by deciding what areas to sell and then arranging to sell these areas.

Second, even if national carriers ultimately divide and sell some of this spectrum, this will clearly be a lower priority item for them than capturing market share and rolling out new services in their main markets. Competition in major urban areas is likely to be fierce over the next two to three year time period and it seems likely that selling off spectrum in rural areas will be delayed while national carriers focus on winning the major battles.

Third, even if national carriers do ultimately sell spectrum that they do not plan to use, they are highly unlikely to sell it to regional carriers that are potential competitors to them. In fact, it seems likely that they may not sell the spectrum outright to any regional carrier. Rather, they may partner (enter into affiliate relationships) with certain types of regional carriers and allow such regional carriers to use the spectrum in return for a share of the profits and a measure of control over the regional carrier. Some cellular and PCS national carriers have been pursuing this business model. Once again, such sales and arrangements are unlikely to produce significant competition between the regional carrier and the national carrier. As explained above, there are many intermediate density areas where certain regional firms provide important competition for national firms. If national firms are allowed to manage the sale of spectrum to regional firms, it is

unlikely that spectrum will be distributed among those regional firms likely to intensify this competition. In fact, national firms may use access to spectrum as a lever to force regional firms to cooperate with them.

In sum, regional carriers are likely to encounter substantial (and perhaps insurmountable) delays and costs in obtaining spectrum through secondary markets. The Commission should adopt an auction design enabling rural carriers to bid directly in the auction rather than relying on problematic subsequent secondary markets.

5. MEA Level Service Areas Will Create a Reasonable Opportunity for Rural/Regional Firms to Bid on Spectrum

As described above, the United States is divided into 52 MEAs and 6 EAGs. The 6 EAGs are formed by combining MEAs.[14] Therefore, roughly speaking, the MEAs are state-sized areas that tend to contain about 5 to 6 million people and the EAGs are regions the size of 8 or 9 states that tend to contain about 47 million people including major urban areas.

The viable strategy for regional firms to follow in the long run will be to build networks that cover natural regional economic footprints outside of major urban areas. (Such natural footprints may well include one or a few medium-sized urban areas necessary to provide effective regional service, such as Minneapolis for service in the rest of Minnesota or Oklahoma City for service in the rest of Oklahoma). This size and type of service area would cover the area where a significant segment of wireless users that live within the region tend to make the bulk of their wireless calls.

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[14]See www.fcc.gov/wtb/auctions for maps of the various regions. (Site visited 5-7-01).

There are two problems with EAGs from this perspective. First, each EAG invariably contains several major urban areas as well as less dense areas and regional/rural firms do not and will not have the financial resources to attempt to enter major urban areas. Second, even ignoring the issue of the presence of major urban areas, the remaining area within an EAG tends to be larger than the economic footprint that many regional carriers would choose to serve. MEA sized areas are much better suited to allow the typical regional carrier to pursue a viable strategy.[15]

For example, the entire West Coast of the United States and adjacent states is defined to be a single EAG. This EAG is divided into 6 smaller MEAs. U.S. Cellular serves a natural economic footprint in the Northwest region of the United States. If service areas were defined at the EAG level, U.S. Cellular would be forced to bid on an area that includes Los Angeles and San Francisco in order to try and better serve customers in its Northwest markets. This would be impossible. On the other hand, the MEA subdivisions would allow U.S. Cellular and other regional/rural carriers to bid on smaller areas in the Northwest that they have a direct interest in serving.

6. MEA-Sized Service Regions Will Still Provide National Firms with a Fair Opportunity to Win Rights to Spectrum over Larger Regions

I will make three points in this section: (1) The normal (non-package) simultaneous round auction held by the Commission is designed to allow national firms a reasonable opportunity to aggregate licenses together; (2) The Commission can provide an even greater opportunity for

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[15]It also seems highly unlikely that a regional/rural carrier would either be able to or wish to borrow money to pursue the risky strategy of buying an entire EAG with the plan to sell off the vast bulk of it, including the major urban areas, on secondary markets.

national firms to aggregate licenses by allowing some simple forms of package bidding, if it determines that this is necessary; and (3) Since the normal (non-package) auction allows national firms a reasonable opportunity to aggregate licenses and because package auctions may cause some new problems, it is not clear whether or not using a package auction format would produce superior results to simply using the standard non-package auction format.

My first point is that, if MEA-sized service areas are chosen, national firms will still have the opportunity to win licenses over larger regions by bidding on multiple licenses under the Commission's standard simultaneous multiple round (SMR) auction procedures. In an SMR auction, firms simultaneously enter bids on all of the licenses over the entire United States and there are multiple rounds of bidding. This means that firms can attempt to accumulate multiple adjacent licenses and that they always have an opportunity to raise their bid on a particularly critical license if they wish to. As the Commission has eloquently explained itself, these procedures facilitate aggregation of licenses.

> For the majority of the FCC auctions conducted since 1994, however, the Commission has used the simultaneous multiple-round auction. In every round, bidders can bid on any of the licenses being offered as long as they have applied for the licenses and have made an upfront payment sufficient for such licenses. Generally, the auction does not close until bidding has ceased on all licenses; that is, until a round goes by in which there are no new bids on any of the licenses. . . The Commission chose a simultaneous auction with multiple-round bidding instead of sequential bidding because this method provides more information to bidders about the values of other licenses up for bid and the opportunity to use that information to aggregate licenses or to shift their bidding from one license to another.[16]

My second point is that the Commission could further facilitate firms' efforts to aggregate licenses if it thought this was necessary by using simple forms of package bidding. The

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[16] *The FCC Report to Congress on Spectrum Auctions*, FCC Wireless Telecommunications Bureau, September 30,1997 at 18.

Commission itself has provided a very clear and simple explanation of what package bidding is and why it might be potentially useful.

> With package bidding, bidders would not be restricted to placing bids on individual licenses, but would also be allowed to place all-or-nothing bids on packages of licenses. This approach would allow bidders to better express the value of any synergies (benefits from combining complementary items) that may exist among licenses, and to avoid *exposure problems* — the risks bidders face in trying to acquire efficient packages of licenses. For example, with package bidding a bidder desiring an aggregation of all six 20 MHz licenses in order to inaugurate a nationwide service could bid on the six licenses as a package and not face the risk of winning only some of the desired licenses and paying more than the bidder values those licenses by themselves (without the other licenses needed to provide nationwide coverage).[17]

It is possible to run relatively simple and tractable package auctions even with as many as 52 service areas by restricting firms to bidding on only a limited number of packages. For example, firms could be allowed to bid on packages of licenses that formed EAGs and also to bid on an entire national package of licenses. Allowing firms to bid on these seven possible packages in addition to bidding on individual MEAs would still allow for a relatively simple and tractable auction.

My third point is that, since the normal (non-package) auction allows national firms a reasonable opportunity to aggregate licenses and because package auctions may cause some new problems, it is not clear whether or not using a package auction would produce superior results. There are two problems associated with using package auctions. First, even a very simple package auction as described above introduces some extra complexity into the auction. Complexity is undesirable both because it increases transactions costs for participants and because

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[17] *Comment Sought on Modifying the Simultaneous Multiple Round Auction Design to Allow Combinatorial (Package) Bidding*, DA 00-1075, May 18, 2000 at 2.

it increases the likelihood that the auction will produce anomalous results due to confusion on the part of participants. More importantly, because of the so-called "threshold problem," there is some reason to believe that a package auction will actually bias the results of the auction towards producing license aggregation even when this is inefficient. That is, a package auction may cause too much aggregation relative to what would be efficient. The Commission has nicely explained the point itself.

> Allowing package bidding does, however, potentially introduce what is termed the *threshold problem* - the difficulty that multiple bidders desiring only the single licenses (or smaller packages) that constitute a package may have in outbidding a single bidder that is bidding for the entire package, even though the multiple bidders may value the sum of the parts more than the single bidder values the whole. Bidders for parts of a larger package each have an incentive to hold back in the hope that a bidder for another piece of the larger package will increase its bid sufficiently for the bids on the pieces collectively to beat the bid on the larger package.[18]

Therefore, in conclusion, I do not view it as a forgone conclusion that it would be desirable for the Commission to allow package bidding if it chooses to define service areas at the MEA level. The normal SMR auction allows bidders a reasonable opportunity to aggregate licenses but may be biased towards producing too little aggregation. Allowing package bidding introduces some extra complexity and, more importantly, it is biased towards producing too much aggregation. If the Commission has been satisfied with the amount of license aggregation that has emerged under previous SMR auctions, there may be no reason to change. On the other hand, some experimentation may yield useful information for future auctions.

If the Commission decides to consider revisions to its decision regarding the auction format for the 746-764 MHz and 776-794 MHz bands, this might be a particularly attractive

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[18] *Comment Sought on Modifying the Simultaneous Multiple Round Auction Design to Allow Combinatorial (Package) Bidding*, DA 00-1075, May 18, 2000 at 2.

opportunity to use a package auction format. The current plan is to define service areas to be EAGs and to allow firms to bid on individual EAGs or packages of EAGs. It would be an unambiguous improvement to this auction to instead define service areas to be MEAs and then allow firms to bid on either individual MEAs, packages of MEAs that form an EAG, or packages of MEAs that form a package of EAGs. At the end of any round the auctioneer would sum the value of the top bids for individual MEAs within any EAG, and view this sum as a separate bid for the EAG (to be compared against a package bid for that EAG). Other than this, the auctioneer could follow exactly the same procedures and rules as currently planned for the 746-764 MHz and 776-794 MHz auctions. The package auction I propose would not be appreciably more complicated than the package auction that the Commission already proposes to run for the 746-764 MHz and 776-794 MHz bands. My proposal would still allow a national or super-regional footprint to emerge if this was the most highly valued use for the spectrum, but it would also allow regional/rural carriers to win smaller regions if this was the most highly valued use of the spectrum.

7. Because of Encumbered Spectrum Due to Existing UHF stations, The Spectrum in the 698-746 MHz Band May Not Be Well-Suited to Providing a New National Service

The synergies that nationally oriented firms may experience from winning national or super-regional footprints for spectrum in the 698-746 MHz range may not be particularly significant in any event. This is because the spectrum in question is encumbered with existing UHF channels that will have the right to continue to use parts of the spectrum in certain geographic areas through at least 2006, and perhaps much longer. These UHF stations tend to be located in more dense areas which are precisely the areas that would be most valuable to a

national provider of some new advanced service.

The Commission itself is well aware of the problem that existing encumbrances will make provision of new nation-wide services difficult. In its NPRM it states: "The significant degree of incumbency will pose considerable challenges to the provision of viable new commercial services prior to the end of the transition."[19] It also notes that the problem for the 698-746 MHz band (which is occupied by channels 52-59) is considerably more severe than the problem for the 746-764 MHz and 776-794 MHz bands (which are occupied by channels 60-69).

> While there are roughly the same number of analog stations on Channels 52-59 as there are on Channels 60-69, there are significantly more digital television incumbents. In particular, there are only 20 digital assignments on Channels 60-69 compared to the 165 assignments on channels 52-59 and this number may increase. As a result, it will be far more difficult for new services to operate on this band, particularly in major metropolitan markets, prior to the end of the transition.[20]

Therefore, winning a nationwide or super-regional license to use a particular band of this spectrum does not actually confer the ability to offer a new service nationwide or super-regionally. Instead it is only the first step in a longer process that would involve cobbling together other bands of spectrum to use in areas that are being used by existing UHF channels. This reduces the value of winning a nationwide or super-regional license and also makes it more likely that even large national firms will use the spectrum to increase their capacity to offer voice services in certain regions or to offer more localized advanced services.

8. Conclusion

If the Commission chooses service areas to be significantly larger than MEAs,

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[19] *NPRM on the 698-746 MHz Band, supra* note 2 , at paragraph 20.
[20] *NPRM on the 698-746 MHz Band, supra* note 2, at paragraph 26.

regional/rural carriers will be unable to participate and the Commission will have essentially prejudged the issue of whether or not their participation would have been efficient and in the public interest. By defining service areas at the MEA level, the Commission can provide a fair opportunity for both regional/rural and national firms to participate in the auction. This will allow competitive bidding to determine the most efficient use of the spectrum.

Table 1
Number of Subscribers Served by Major Regional and National Wireless Carriers [21]

Carrier	Subscribers (000's)	
Major independent regional/rural carriers:		
ALLTEL	6,300	
U.S. Cellular	3,061	
Western Wireless	1,050	
Qwest	805	
CenturyTel	751	
Centennial	663	
Rural Cellular	565	
PR Tel Cell	335	
Leap Wireless	190	
NTELOS (CFW Comm)	168	
Total of 10 major independent regional/rural carriers:		13,888
National carriers:		
Verizon	28,040	
Cingular	19,681	
AT&T Wireless	16,276	
Sprint PCS	10,375	
Nextel	6,907	
VoiceStream	4,787	

[21] Source: *Wireless Market Stats*, Paul Kagan Associates, No. 138, March 9, 2001, at 7. Subscriber numbers are for the end of 2000. This source reports that total U.S. subscribers were 101,357,000 at the end of 2000. Subscribers for national carriers include those of their affiliates as reported in the source. Two changes were made to the Kagan data to reflect very recent ownership/affiliation changes: the VoiceStream figure is increased by 908,000 to include Powertel subscribers and the Verizon figure is increased by 535,000 to include the Price Communications subscribers. Affiliates of national carriers are excluded from the list of independent regional/rural carriers.

Table 2
Licensed POPs of Major Regional and National Wireless Carriers[22] [23]

Carrier	Licensed POPs (000's)	Percent of National POPs
Major independent regional/rural carriers:		
ALLTEL	63,098	22%
U.S. Cellular	33,911	12%
Western Wireless	9,837	4%
Qwest	26,094	9%
CenturyTel	11,996	4%
Centennial	9,887	4%
Rural Cellular	6,132	2%
PR Tel Cell	3,883	1%
Leap Wireless	72,456	26%
NTELOS (CFW Comm)	10,832	4%
National carriers:		
Verizon	251,000	89%
Cingular	254,000	90%
AT&T Wireless	274,000	98%
Sprint PCS	281,000	100%
Nextel	281,000	100%
VoiceStream	272,000	97%

[22] "Licensed POPS refers to the total population that lives in the area a carrier is licensed to serve.
[23] Source: Figures for regional/rural carriers from *Wireless Market Stats*, Paul Kagan Associates, No. 138, March 9, 2001, at 8, 9. Data as of March 9, 2001. Figures for national carriers from *The Next Generation V*, Merrill Lynch Associates, March 9, 2001 at 22. The data from both Paul Kagan and Merrill Lynch are as of the end of 2000, but each has been adjusted by the source to reflect the results of Auction 35. The licensed POPs shown are unduplicated totals for each carrier, which reflect counting market POPs one time where multiple licenses are held. Figure used for national population is 281 million . Licensed POPs for national carriers include those of national affiliates as reported in the source.

Table 3
Covered POPs as a Percent of Licensed POPS for National Carriers[24]

Carrier	Covered POPs (Mil)	Licensed POPS (Mil)	Covered Pops As a Percentage Of Licensed POPS
Verizon	203	240	85%
Cingular	177	190	93%
AT&T Wireless	193	270	71%
Sprint PCS	196	278	71%
Nextel	196	278	71%
VoiceStream	118	241	49%

[24]Source: *Wireless Spectrum,* Merrill Lynch, September 25, 2000 at 3-4. Data as of September 2000. POPS for national carriers include unduplicated POPS of affiliates as reported in source. Note that Merrill Lynch has published licensed and covered POPs data for the national carriers which is more recent than September 2000 (*The Next Generation V*, Merrill Lynch, March 9 2001). The more recent data on licensed POPs reflects newly-acquired licenses for some carriers in Auction 35, as shown in Table 2. The somewhat older data from September 2000 is used in Table 3 so as to present analysis of covered POPs as a percentage of licensed POPs without counting the newly-acquired licenses with uncovered POPs. For carriers which acquired licenses for new areas in Auction 35, the more recent data are likely to show even less build-out of licensed areas than in Table 3.

Table 4
Market Share of Regional Carriers in Selected U.S. Cellular Markets Ordered From Highest Market Share to Lowest[25]

RSA/MSA	Market Share of All Regional Carriers (%)
IA RSA 1	100
IA RSA 2	100
IA RSA 3	100
IA RSA 11	100
IA RSA 12	100
IA RSA 13	100
IA RSA 14	100
IA RSA 16	100
MO RSA 3	100
MO RSA 5	100
MO RSA 15	100
MO RSA 16	100
VT RSA 2	100
OK RSA 8	100
Lacrosse MSA	100
WI RSA 7	100
WI RSA 8	100
Cumberland MSA	100
PA RSA 10	100
GA RSA 14	99.8
WV RSA 3	99.4
WI RSA 10	99
IA RSA 6	97.4
OR RSA 6	97.4
Lynchburg MSA	96.2
OK RSA 6	96.1
NC RSA 13	95.7
NC RSA 11	94.4
NC RSA 14	94.4
WI RSA 9	94.4
TN RSA 4	93.3
NC RSA 8	92.7
NC RSA 10	92.5
Jacksonville MSA	92.4
OR RSA 3	90
Charlottesville MSA	87.4
OK RSA 10	82.8
Tallahassee MSA	79

[25]Source: U.S. Cellular data based on studies conducted between February 2000 and April 2000. Subscribers served by regional affiliates of national firms are included as subscribers of national firms, i.e., the market shares of regional firms reported above are market shares for unaffiliated regional firms. The total market share of all national firms in any RSA/MSA (including affiliates of national firms) is equal to 100 percent minus the number reported in the above table.

IA RSA 9	78
Hagerstown MSA	77.3
Gainesville MSA	75.9
Wilmington MSA	75.1
Dubuque MSA	73
Waterloo MSA	71.4
OK RSA 4	71.2
IA RSA 5	70.1
Madison MSA	65.5
IA RSA 4	65.3
Iowa City MSA	64
Sheboygan MSA	64
CA RSA 1	62.5
Lawton MSA	61.8
VA RSA 3	61.1
WV RSA 4	60.6
IL RSA 4	57.9
TX RSA 20	56.5
ID RSA 5	55.4
Yakima MSA	55.4
ID RSA 6	55.3
Wichita Falls MSA	55
Davenport MSA	54.9
Cedar Rapids MSA	54.8
Roanoke MSA	53.4
IA RSA 10	53.3
Des Moines MSA	53.2
Ashville MSA	53
WA RSA 5	50.3
TN RSA 7	50
WA RSA 6	48.2
IL RSA 1	45.7
Rockford MSA	44.3
OK RSA 9	43.8
Richland MSA	42
OH RSA 9	41.9
Columbia MSA	40.8
NH RSA 2	40.6
Laredo MSA	39.5
Milwaukee MSA	37.8
Peoria MSA	37.6
Kenosha MSA	37.1
IL RSA 3	36.9
Tulsa MSA	35.5
Knoxville MSA	35.1
OR RSA 2	34.7
Fort Pierce MSA	31.4
IA RSA 7	30.4
Victoria MSA	27.9
Corpus Christi MSA	21.1
WA RSA 4	11.7
NC RSA 4	11.4

May, 2001

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Shelby Cullom Davis Fellowship, 1979
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NSF Grant SES-8504304, "Moral Hazard, Reputation, and Product Quality," April 1985 - September 1987
NSF Grant IRI-8705477, "Contracting Under Asymmetric Information," July 1987 - December 1989

Named to Household International Professorship in Economics, September 1987 - August 1989
Lynde & Harry Bradley Foundation Research Grant, "An Economic Analysis of Defense Procurement Regulations," June 1989 - December 1991.
NSF Grant SES-8906751, "Profit Regulation of Defense Contractors," August 1, 1989 - July 31, 1991.
Olin Fellow at The Centre for the Study of the Economy and the State, University of Chicago, October 1, 1989 - June 30, 1990.
Faculty Fellow, Center for Urban Affairs and Policy Research, Northwestern University, September 1991-present.
Smith Richardson Foundation, Inc. Research Grant, "Economic Incentives and the Defense Procurement Process," March 1, 1993 - May 31, 1995.
Elected a Fellow of the Econometric Society, 1999.

Research and Teaching Interests

Incentives and Information in Markets and Organizations, Regulation, Industrial Organization, Cost Accounting, Telecommunications, Defense Procurement, and Health Care.

Employment History

Research Assistant to Canadian Member of Parliament, Arnold Malone, June 1975 - September 1975
Teaching Assistant at University of Alberta, September 1975 - June 1976
Economist, Department of Industry, Trade and Commerce, Government of Alberta, June 1976 - September 1976
Research Assistant, Environmental Quality Laboratory, Caltech, June 1977 - September 1977
Economist, Long Range Planning and Structural Analysis Division, Department of Finance, Government of Canada, June 1978 - September 1978
Teaching Assistant to Professor Charles R. Plott, Division of Humanities and Social Sciences, Caltech, September 1979 - June 1980
Assistant Professor of Economics, Stanford University, September 1980 - August 1984
Associate Professor of Economics, Northwestern University, September 1984 - May 1990
Professor of Economics, Northwestern University, May 1990 - Present
Chair, Economics Department, Northwestern University, September 1996 - August 1998.
Chief Economist, Federal Communications Commission, June 1, 1998-May 31, 1999 (on leave from Northwestern for this year.)
Director, Northwestern Program in Mathematical Methods in the Social Sciences, September 2000- present.

Professional Activities

Editor of Defense and Peace Economics, January 1995 - December 1998.
Member of the editorial board of Defense and Peace Economics, September 1991 - December 1998.
Member of the editorial board of Review of Accounting Studies, September 1993 to present.
Member of the editorial board of Journal of Industrial Economics, October 1995- Sept. 1998.
Chief Economist of Federal Communications Commission, June 1, 1998 - May 31, 1999.
Member of the Illinois Economic Policy Council, September 1999 to present.
Consultant to: Federal Communications Commission, Federal Trade Commission, Institute for Defense Analysis, Logistics Management Institute, Office of the Secretary of Defense (Program Analysis and Evaluation), RAND Corporation, US Department of Justice

Refereed Publications

"Aggregate Expected Consumer Surplus As a Welfare With an Application to Price Stabilization," Econometrica, 49, No. 2, (March 1980), pp. 423-436.
"Agriculture in Development: A Game-Theoretic Analysis," with Robert Bates, Public Choice, 35, (1980), pp. 513-527.
"The Social Costs of Monopoly and Regulation: A Game-Theoretic Analysis," Bell Journal of Economics, 13, No. 2, (Autumn 1982), pp. 391-401.
"Reputation and Product Quality," Bell Journal of Economics, 14, No. 2, (Fall 1983), 508-515.
"Consumer Misperceptions, Market Power and Product Safety," with Mitchel Polinsky, Bell Journal of Economics, 14, No. 2, (Fall 1983), 581-589.
"A Note on the Incentive for a Monopolist to Increase Fixed Costs as a Barrier to Entry," Quarterly Journal of Economics, 396, May 1984, 399-402.
"Efficient Reliance and Damage Measures for Breach of Contract," Rand Journal of Economics, Spring 1984, 39-53.
"Repeated Moral Hazard," Econometrica, 53, January 1985, 69-76.
"The First-Order Approach to Principal Agent Problems," Econometrica, 53, November 1985, 1357-1368.
"Robust Trading Mechanisms" with Kathleen Hagerty, Journal of Economic Theory, 42, June 1987, 94-107.
"The Dissipation of Profits by Brand Name Capital and Entry When Price Guarantees Quality," Journal of Political Economy, 95, August 1987, 797-809.
"A Note on the Existence of Single Price Equilibrium Price Distributions," Review of Economic Studies, 54, April 1987, 339-342.

"Price Advertising and the Deterioration of Product Quality," Review of Economic Studies, 55, April 1988, 215-230.

"Profit Regulation of Defense Contractors and Prizes for Innovation," Journal of Political Economy, 97, December 1989, 1284-1305.
"Quality vs. Quantity In Military Procurement," American Economic Review, 80, March 1990, 83-92.
"Excess Capacity in Weapons Production: An Empirical Analysis," Defence Economics, 2, 1991, 235-250.
"Optimal Depreciation Schedules for Regulated Utilities," Journal of Regulatory Economics, 4, 1992, 5-33.
"Contractual Solutions to the Hold-Up Problem," Review of Economic Studies, 59, October 1991, 777-794.
"Incentives, the Budgetary Process, and Inefficienctly Low Production Rates in Defense Procurement," Defence Economics, 3, 1991, 1-18.
"Overhead Allocation and Incentives for Cost Minimization in Defense Procurement," The Accounting Review, 67, 1992, 671-690.
"Choice of Treatment Intensities by a Nonprofit Hospital Under Prospective Pricing," Journal of Economics and Management Strategy, 3(1), Spring 1994, 7-52..
"Economic Incentives and the Defense Procurement Process," Journal of Economic Perspectives, 8(4), Fall 1994, 65-90.
"Inter-Temporal Cost Allocation and Managerial Investment Incentives," Journal of Political Economy, 105(4), 1997, 770-795.
"The Regulation of Broadband Telecommunications, The Principle of Regulating Narrowly Defined Input Bottlenecks, and Incentives for Investment and Innovation," University of Chicago Legal Forum, 2000, 119-147.

Other Publications

"Electric Generation Plants" Appendix F.1 in Implementing Tradable Emissions Permits for Sulfur Oxides Emissions in the South Coast Air Basin, Vol. II, by Glen R. Cass, Robert W. Hahn, Roger G. Noll, ARB Contract No. A8-141-31, June 30, 1982.
"A Comment on Political Institutions and Fiscal Policy: Evidence from the U.S. Historical Record," Journal of Law Economics and Organization, 6, Special Issue, Conference on "The Organization of Political Institutions", 1991, 155-166.
"Inefficiently Low Production Rates in Defense Procurement: An Economic Analysis," Leitzel, Jim and Jean Tirole, eds., Incentives in Defense Procurement. Boulder: Westview Press, 1993.
Profit Regulation of Defense Contractors and Prizes for Innovation, RAND, R-3635-PA&E, 1991.
An Economic Framework for Analyzing DoD Profit Policy, RAND, R-3860-PA&E, 1991.

Overhead Allocation and Incentives for Cost Minimization in Defense Procurement, RAND, R-4013-PA&E, 1992.

"Review of 'A Theory of Incentives in Procurement and Regulation,'" book review, Journal of Political Economy, 102, 1994, 397-402

On the Use of Transfer Prices in DoD: The Case of Repair and Maintenance of Depot Level Reparables by the Air Force, Logistics Management Institute Paper PA303RD2, January 1995, Logistics Management Institute, McLean, VA.

"Incentive Models of the Defense Procurement Process," in Hartley, Kieth, and Todd Sandler, eds., The Handbook of Defense Economics, North Holland, 1995, 309-346..

"The Economics of University Indirect Cost Reimbursement in Federal Research Grants," (with Roger Noll) in Roger Noll, ed., Challenges to the Research University. Washington: Brookings Institution, 1997.

"New Economic Perspectives on Telecommunications Regulation," (review of Competition in Telecommunications, bu Jean-Jacques Laffont and Jean Tirole), University of Chicago Law Review, 67, Fall 2000, 1489-1505.

Recent Papers

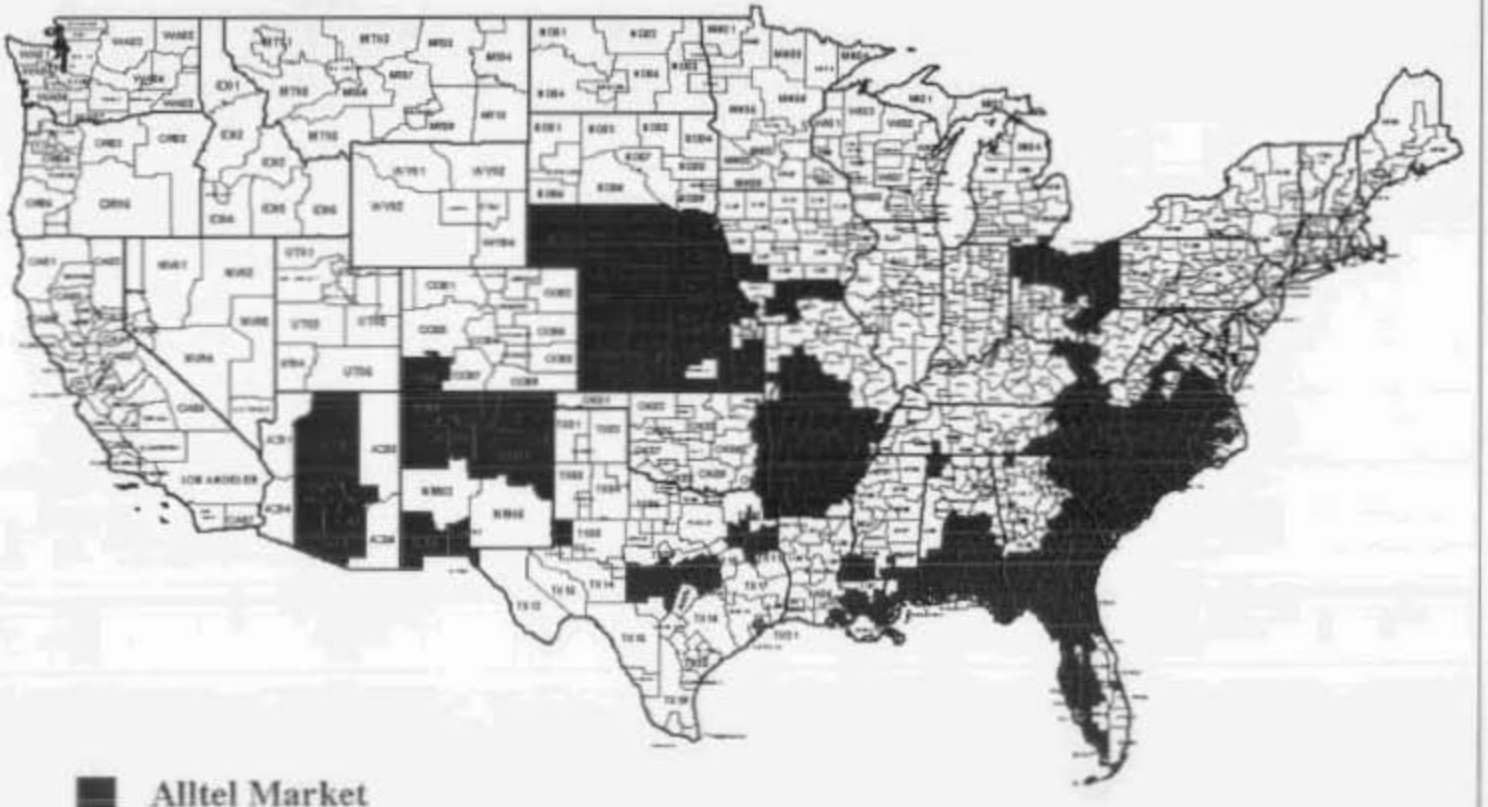
"Renegotiation of Fixed Price Contracts on the F-16 Program," (with Tom Frazier), mimeo.

"The Use of Simple Menus of Contracts in Cost-Based Procurement and Regulation," mimeo.

ATTACHMENT B

Maps of Licensed Service Areas for the following: ALLTEL, Centennial Wireless, Centurytel, Leap, Qwest, RCC, U.S. Cellular, and Western Wireless.

Alltel Positions Map

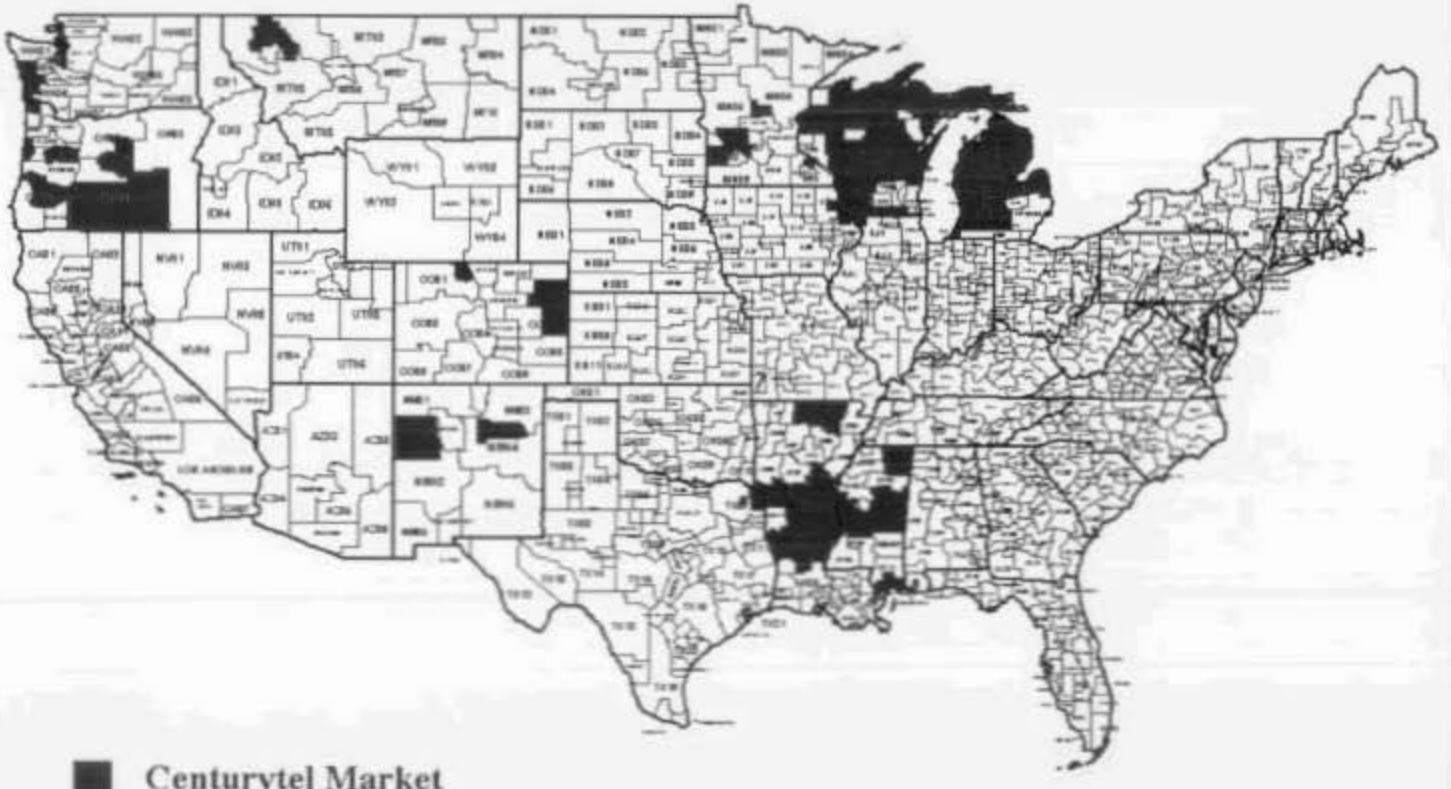


Alltel Market

Centennial Wireless Positions Map

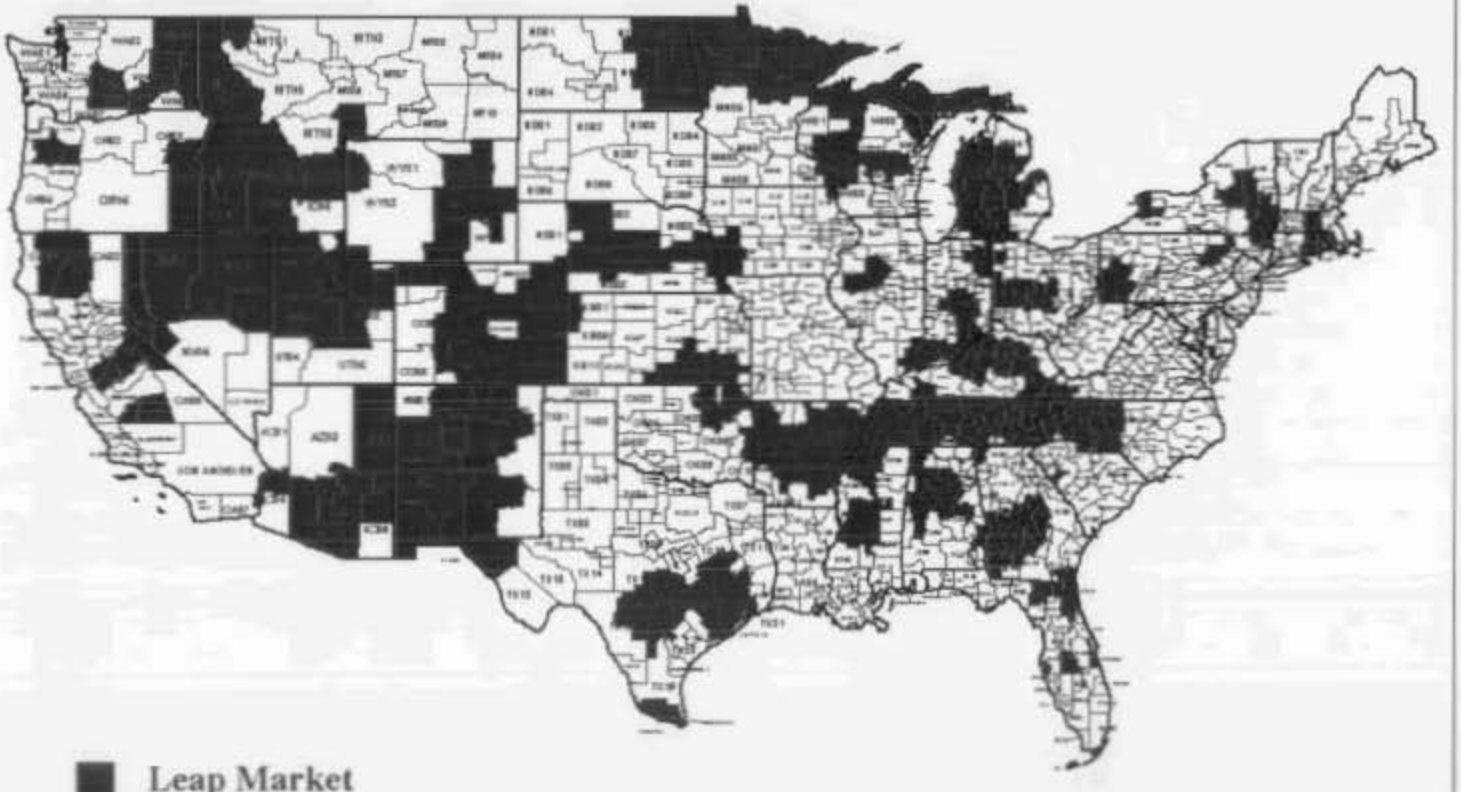
Centennial Market

Centurytel Positions Map



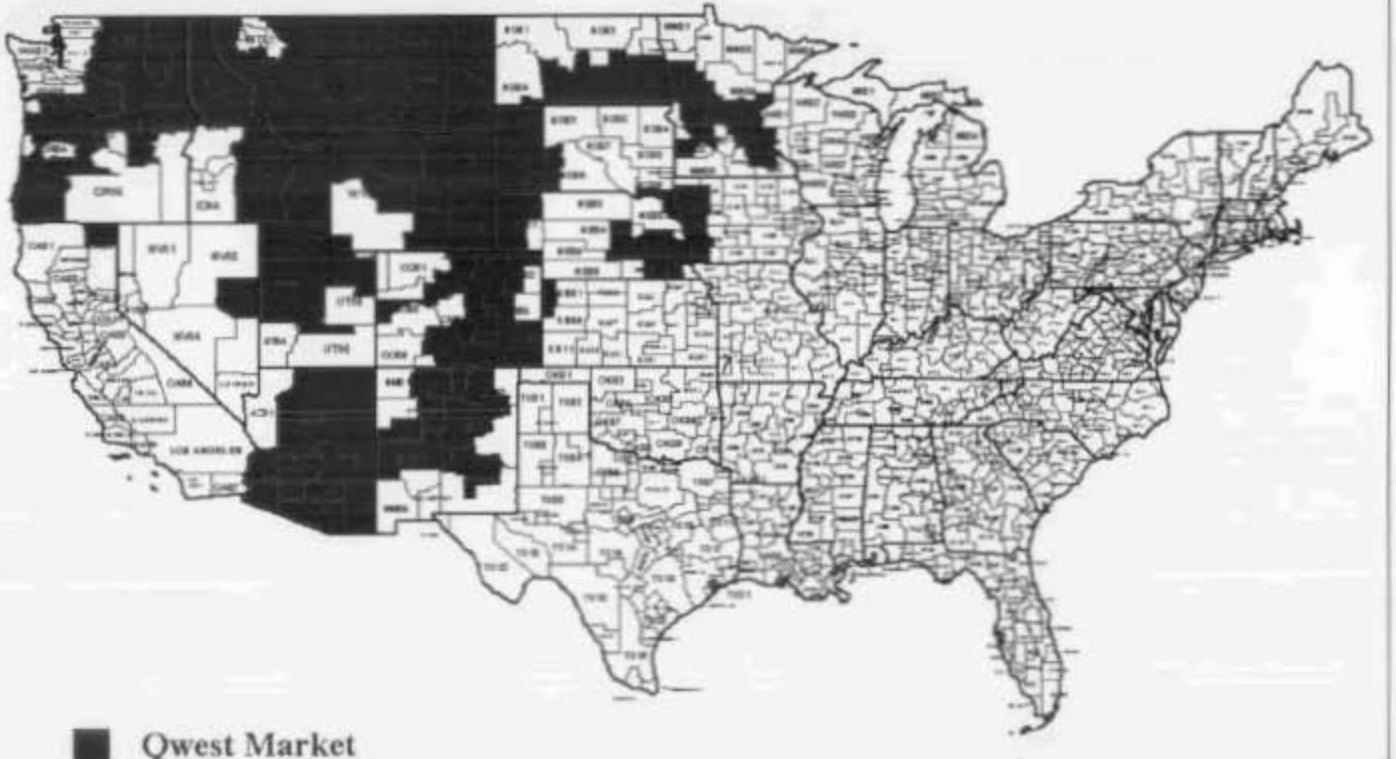
Centurytel Market

Leap Positions Map



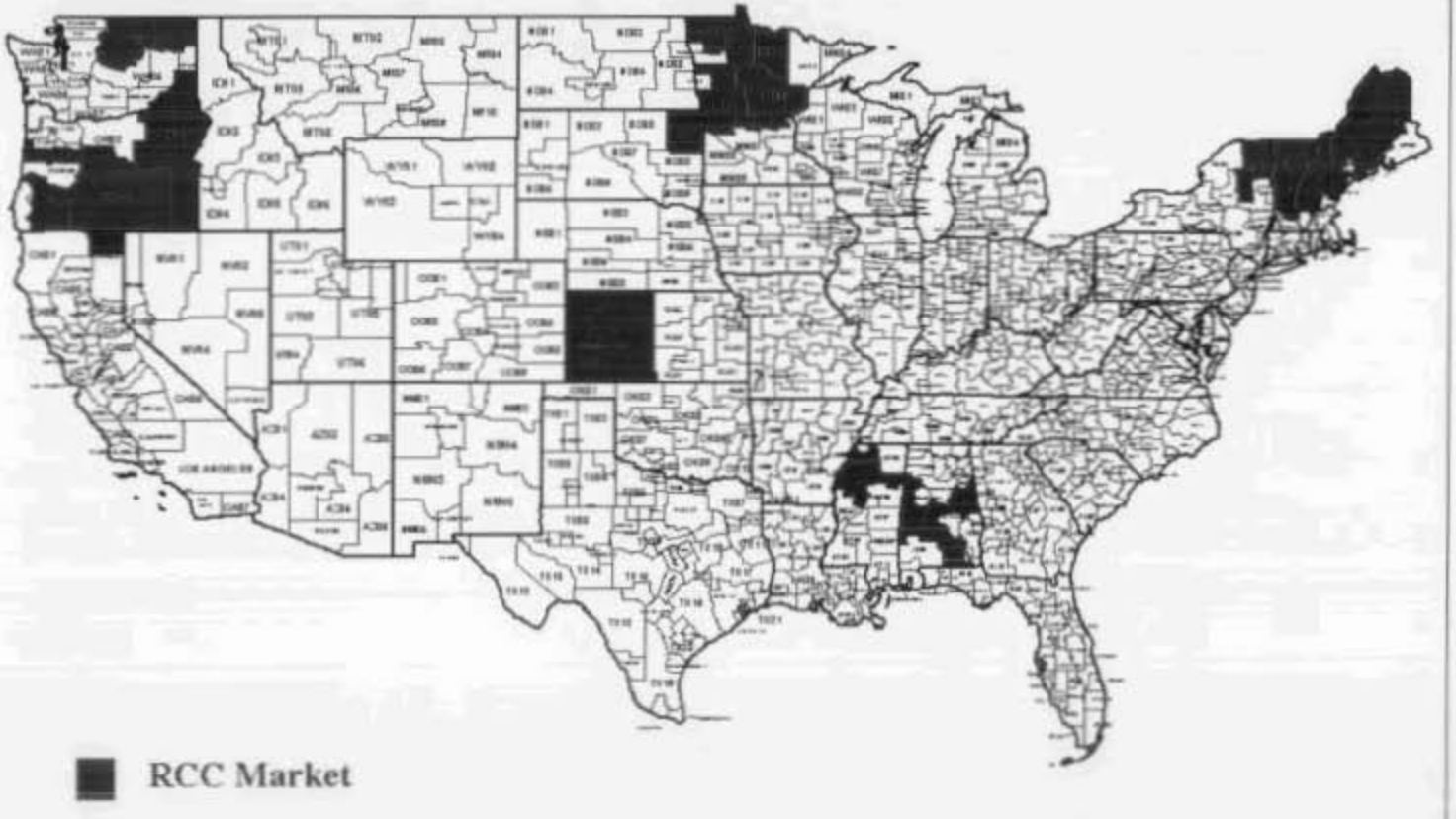
Leap Market

Qwest Positions Map



Qwest Market

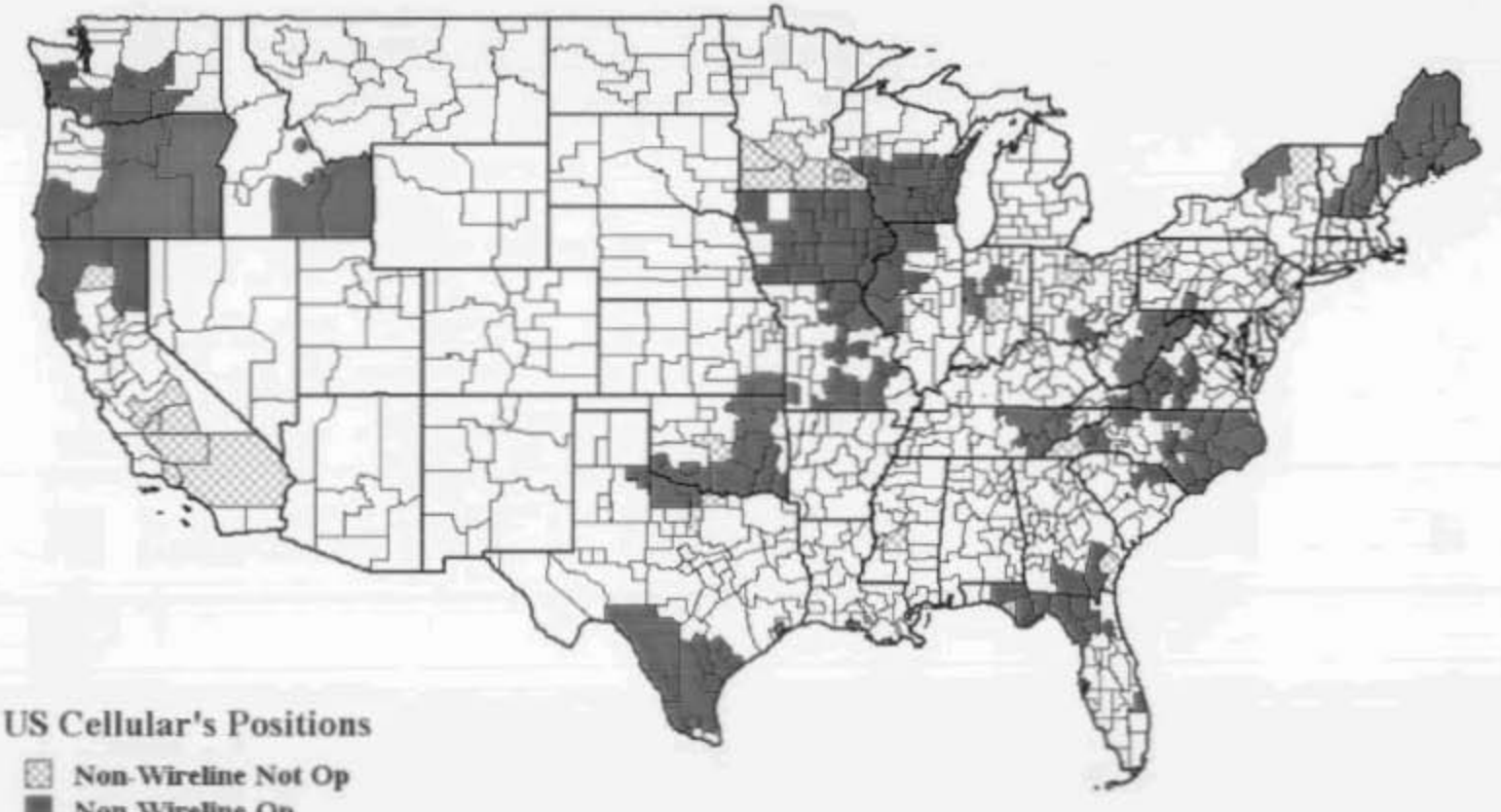
RCC Positions Map



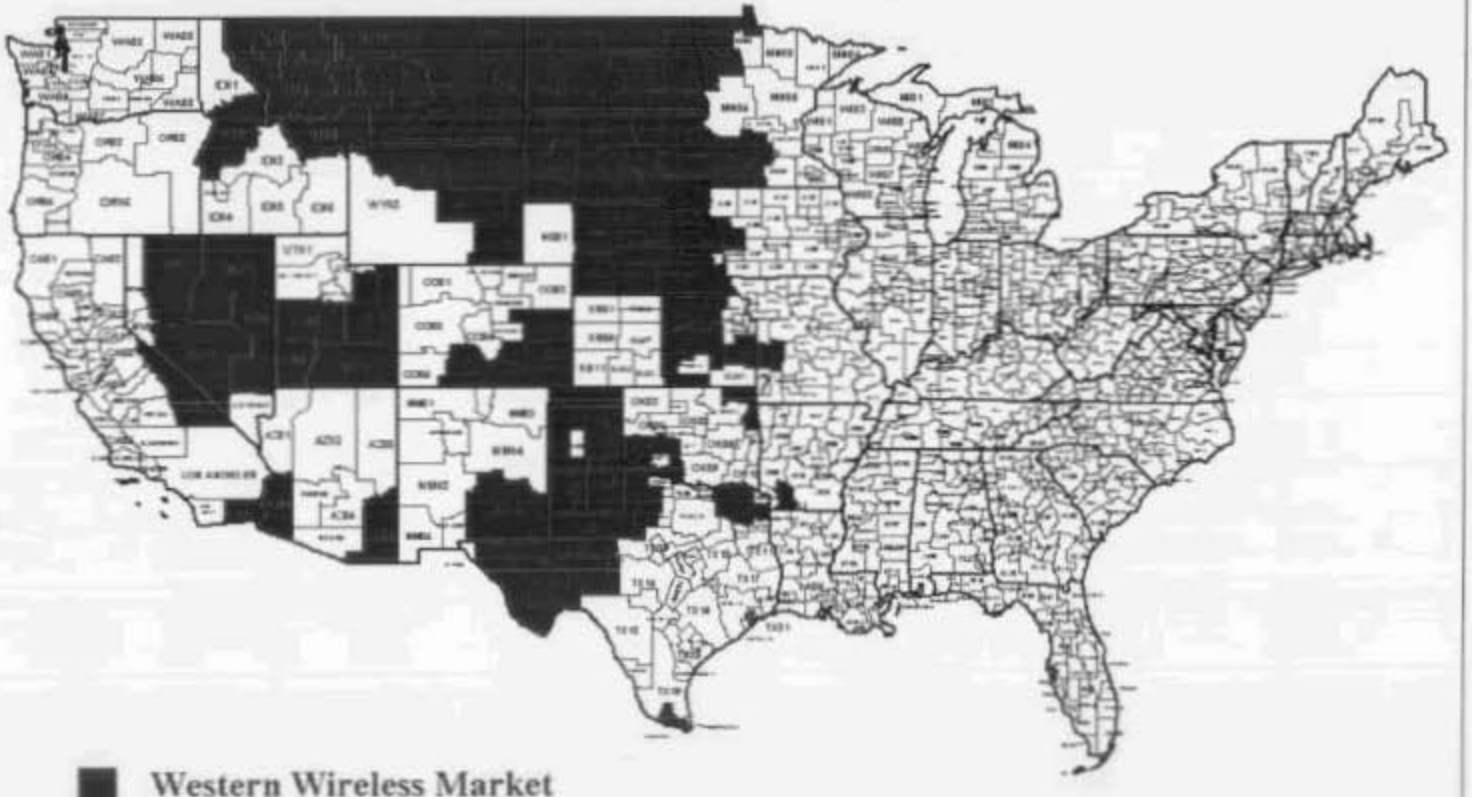
RCC Market

4-30-2001

US Cellular's Positions



Western Wireless Positions Map



Western Wireless Market